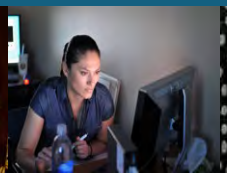
Technical Area-V Groundwater Investigation



Jun Li
Environmental Restoration Operations

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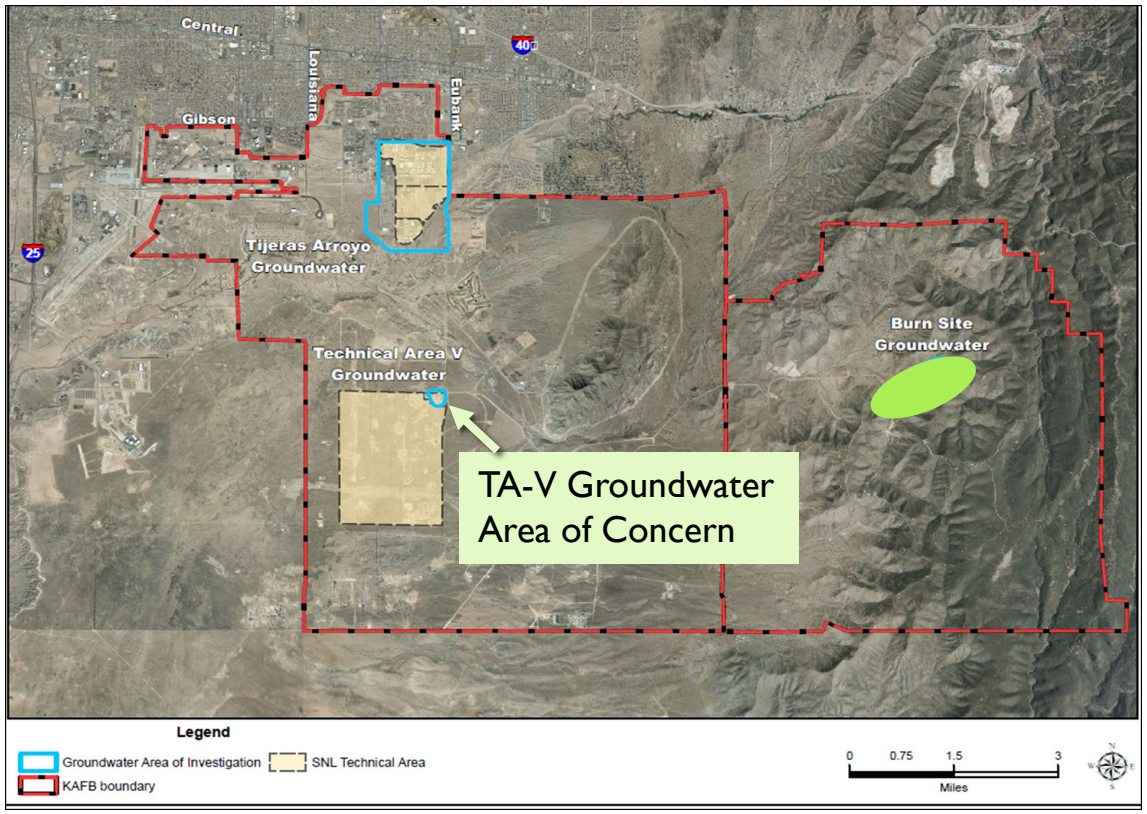
TA-V Groundwater Area of Concern Site Description

- The groundwater at Technical Area-V (TA-V) at Sandia National Laboratories (SNL) is designated an Area of Concern (AOC) in the Compliance Order on Consent.
- TA-V is an industrial area in the west-central portion on Kirtland Air Force Base (KAFB). The area of TA-V is approximately 35 acres.

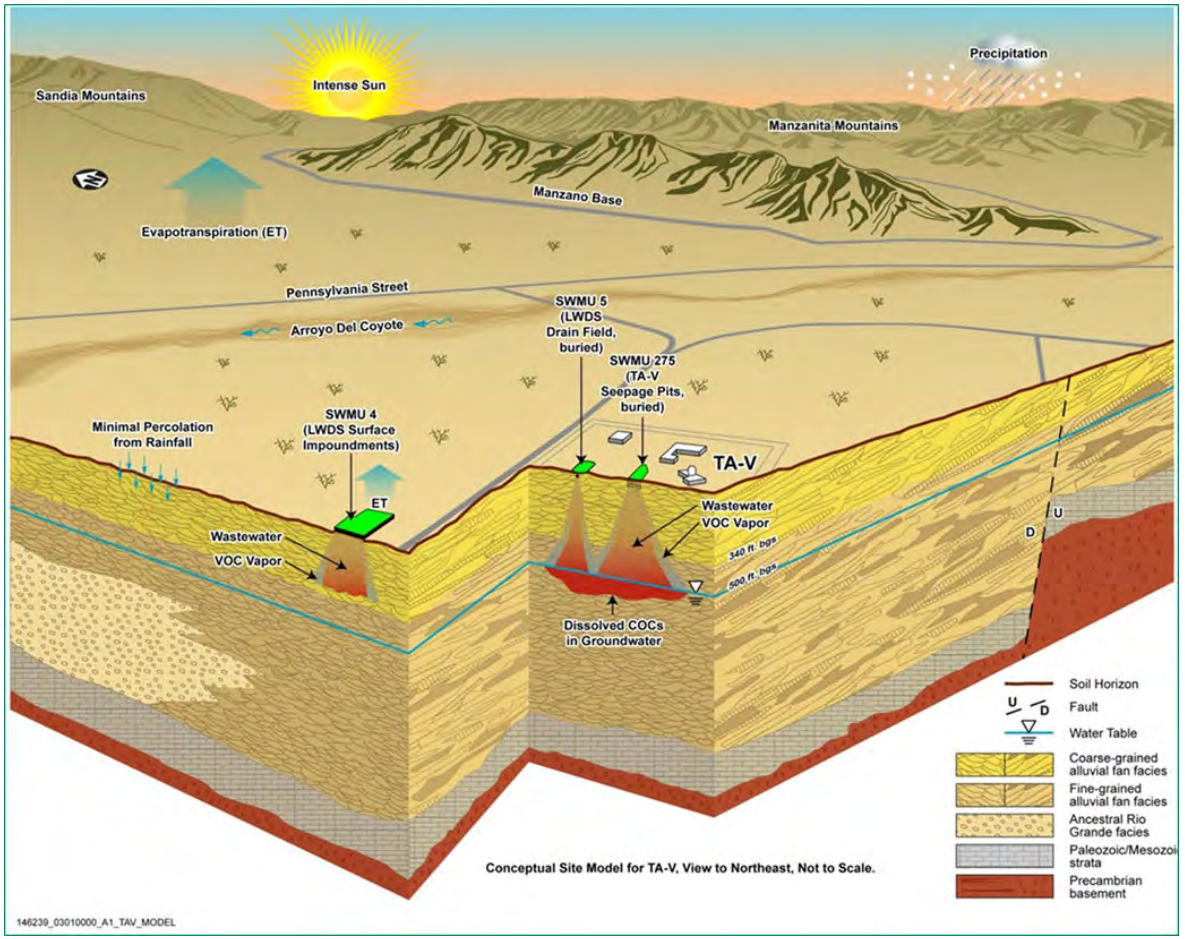


TA-V Groundwater Area of Concern Site Description

- SNL activities at TA-V began in 1961 and involve operating research reactors.
- All the surface and shallow subsurface contamination has been addressed and corrective action is complete. Now corrective action is required only for the groundwater at TA-V.

TA-V Groundwater Area of Concern Site Description

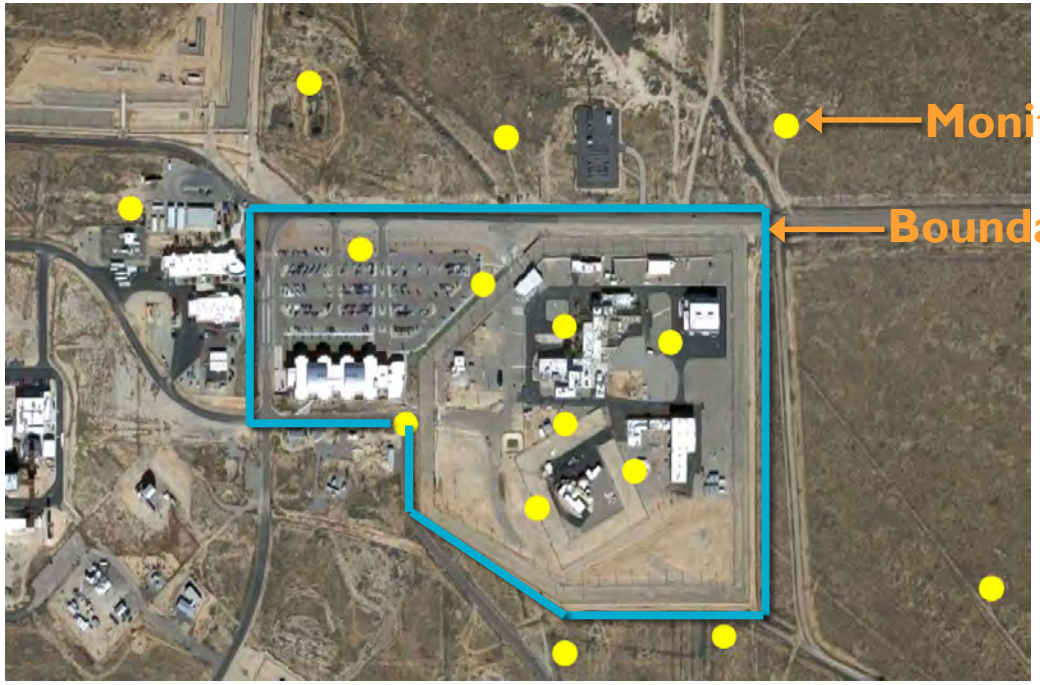
- Groundwater at TA-V occurs in the Regional Aquifer that resides in fine-grained, clay-rich, alluvial fan sediments. The water table is approximately 500 – 520 feet below the ground surface at TA-V.



Conceptual Site Model of Groundwater Contamination Process at TA-V

TA-V Groundwater Monitoring

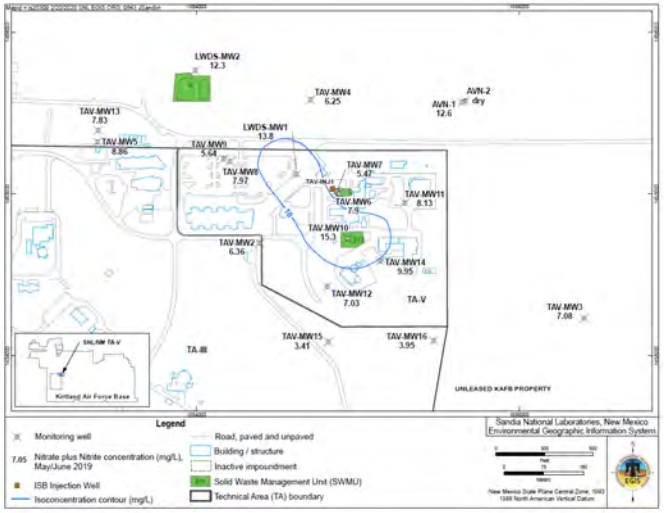
- Groundwater monitoring began in 1992.
- Current monitoring network consists of 18 wells.
- Groundwater is contaminated with nitrate and trichloroethene (TCE) at concentrations above the U.S. Environmental Protection Agency maximum contaminant levels (MCLs) for drinking water.
- No other constituents in TA-V groundwater exceed the MCLs.

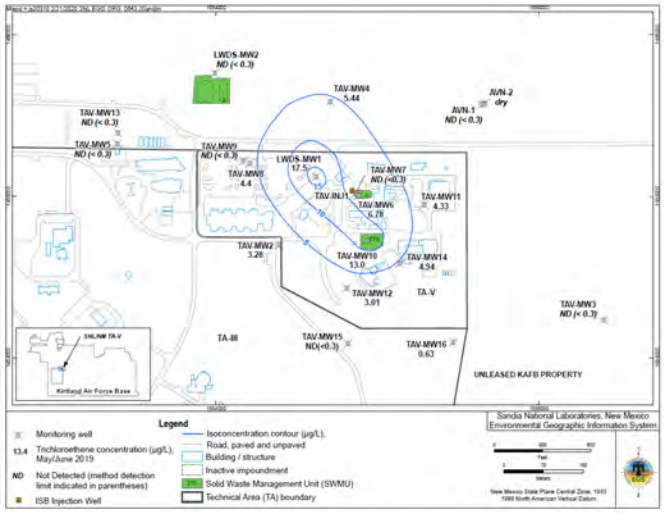


TA-V Groundwater Monitoring

- Nitrate plume covers approximately 1.4 acres.
- Trichloroethene plume covers approximately 13 acres.
- Both plumes are stable. Neither plume is moving away from TA-V.

Constituent of Concern	Maximum Concentration in 2019	MCL
Nitrate	15.3 milligrams per liter (well TAV-MW10)	10 milligrams per liter
Trichloroethene	20.2 micrograms per liter (well LWDS-MW1)	5 micrograms per liter





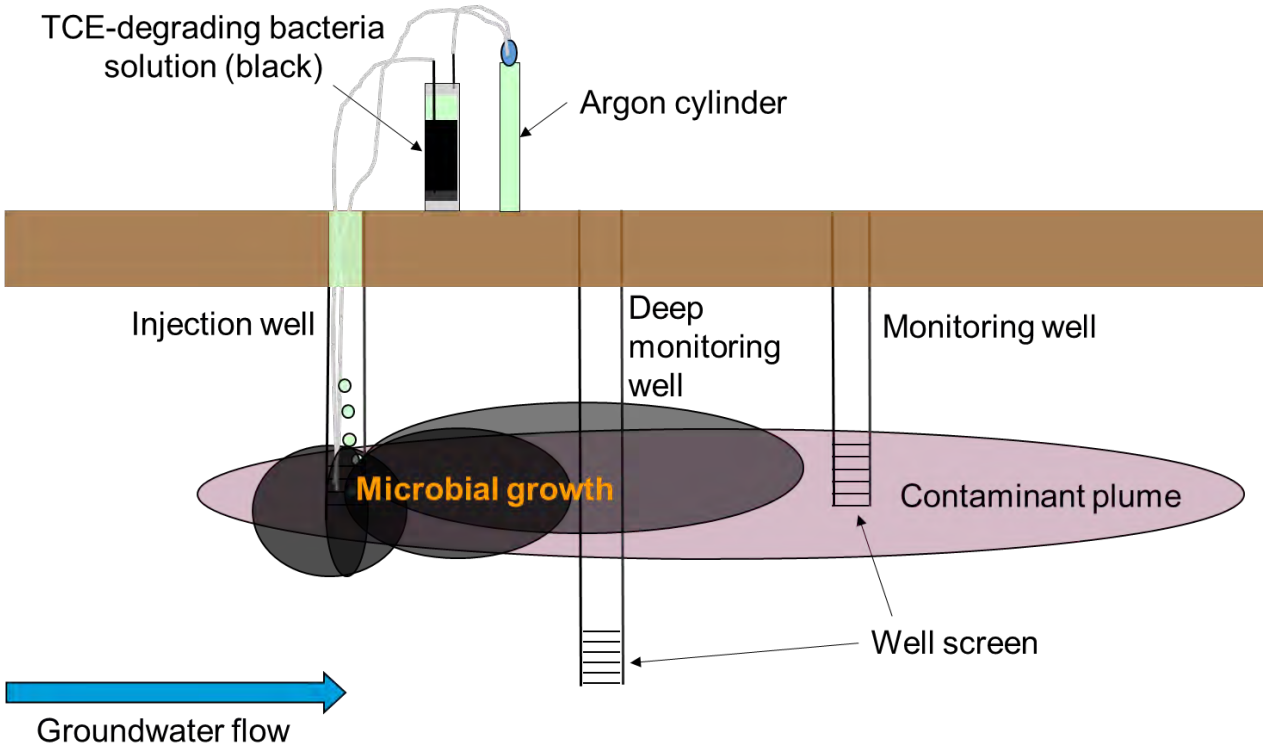
Source: 2019 Annual Groundwater Monitoring Report, Nitrate Plume (left) and TCE Plume (right)

TA-V Groundwater Monitoring

- Groundwater in this area is not used for any purpose.
- Nearest downgradient drinking-water supply well (KAFB-4) is 2.7 miles to the north.
- The plumes are not adversely impacting human health and the environment.

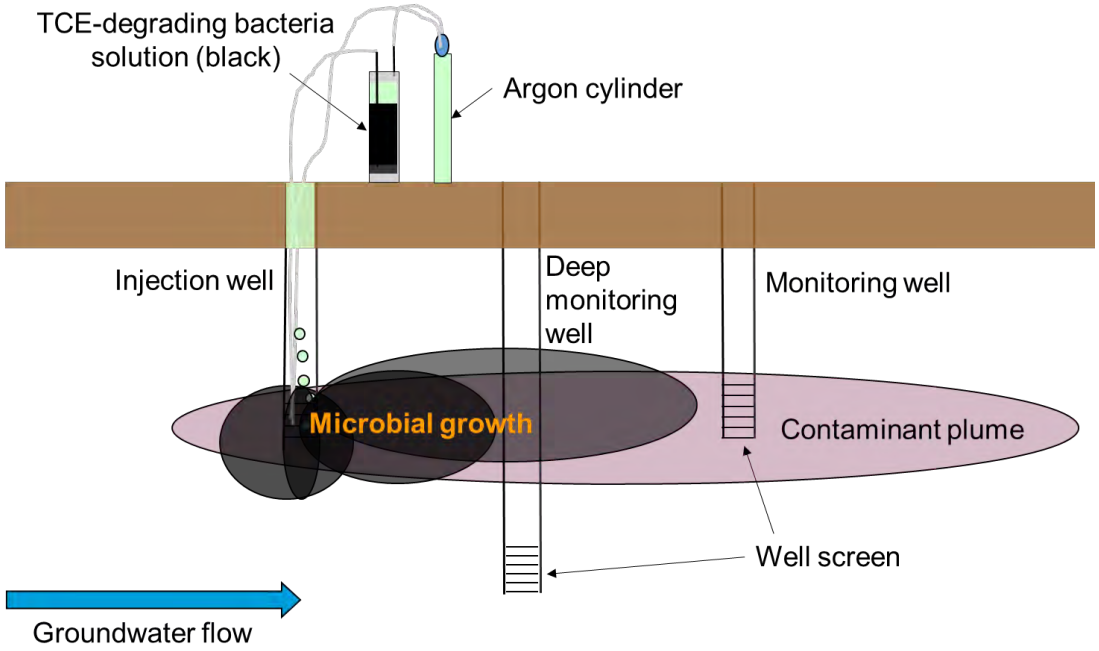
Treatability Study of In-Situ Bioremediation at TA-V

- The plan of the treatability study is to deliver bioremediation solution using one injection well.
- The objective is to evaluate the effectiveness of in-situ bioremediation as a corrective measure for the TA-V Groundwater AOC.



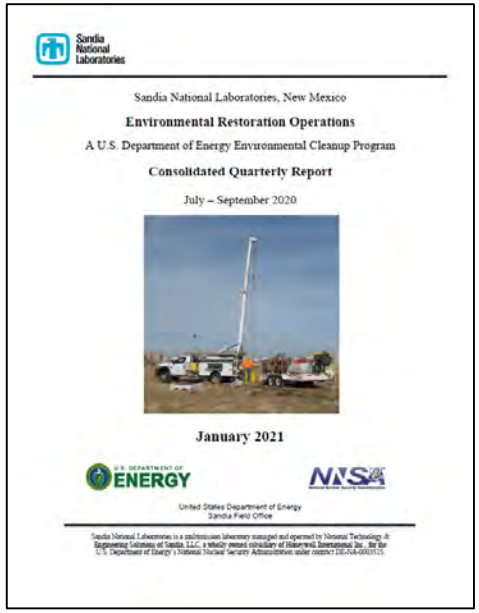
Treatability Study of In-Situ Bioremediation at TA-V

- Groundwater at TA-V is aerobic, and biodegradation is not naturally occurring.
- Bioremediation solution provides the nutrients and pH buffer for the bacteria to biodegrade nitrate and trichloroethene.
- How large an area can be treated by the bioremediation solution injected?



Treatability Study of In-Situ Bioremediation at TA-V

- The New Mexico Environment Department (NMED) Hazardous Waste Bureau (HWB) is the regulator for the investigation.
- The NMED Ground Water Quality Bureau (GWQB) issued the Discharge Permit DP-1845 to discharge bioremediation solution to groundwater using injection well.
- Progress on the treatability study is provided to the NMED HWB and GWQB through quarterly reporting.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A U.S. Department of Energy Environmental Cleanup Program

Consolidated Quarterly Report

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January 2021

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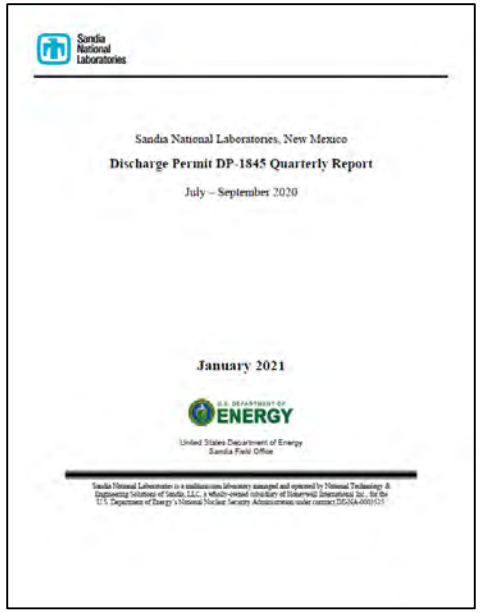
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Treatability Study at Injection Well TAV-INJ1

- Injected approximately 531,000 gallons of bioremediation solution and 123 liters of trichloroethene-degrading bacteria from November 2018 to April 2019.
- Injection well TAV-INJ1 and monitoring well TAV-MW6 are monitored for the performance of in-situ bioremediation.
- One deep well and eight surrounding wells are monitored to determine potential impact on groundwater quality caused by the bioremediation solution injected.

Findings of Treatability Study at Injection Well TAV-INJ1

- Groundwater at injection well TAV-INJ1 has been maintaining optimal conditions for biodegradation.
- The inert tracer (bromide) injected with the bioremediation solution has reached monitoring well TAV-MW6.
- Dissolved oxygen level has decreased in the groundwater at well TAV-MW6; however, anaerobic condition is not established.
- No change in groundwater quality has been observed in the deep monitoring well and the eight surrounding wells.

Findings of Treatability Study at Injection Well TAV-INJ1

- Delivery of bioremediation solution was limited by low hydraulic conductivities of the aquifer at TA-V.
- Infrastructure at TA-V (buildings and utilities) limits installation of multiple injection wells impeding the success of the in-situ bioremediation technology at this site.
- Findings of the treatability study of in-situ bioremediation at injection well TAV-INJ1 were shared with NMED HWB in September 2020.
- Complete the two-year performance monitoring in May 2021.

That's a wrap for the evening!